TASK 1:

The below example is referring to Elasticsearch, but feel free to choose any stateful service of your choice (MySQL, Mongo db, Kafka, etc)

- Deploy a Kubernetes on a **3 node cluster**.

```
NAME           STATUS   ROLES                  AGE   VERSION
k8s-master     Ready    control-plane,master   65m   v1.24.4
k8s-worker-1   Ready    worker                 53m   v1.24.4
k8s-worker-2   Ready    worker                 47m   v1.24.4
```

- Installation of **CRD (Custom Resource Definitions)** and **Operation with RBAC(Role Based Access Control)** rules.

```
vagrant@k8s-master:~$ sudo kubectl create -f https://download.elastic.co/downloads/eck/2.5.0/crds.yaml
customresourcedefinition.apiextensions.k8s.io/agents.agent.k8s.elastic.co created
customresourcedefinition.apiextensions.k8s.io/apmservers.apm.k8s.elastic.co created
customresourcedefinition.apiextensions.k8s.io/beats.beat.k8s.elastic.co created
customresourcedefinition.apiextensions.k8s.io/elasticmapsservers.maps.k8s.elastic.co created
customresourcedefinition.apiextensions.k8s.io/elasticsearchautoscalers.autoscaling.k8s.elastic.co created
customresourcedefinition.apiextensions.k8s.io/elasticsearches.elasticsearch.k8s.elastic.co created
customresourcedefinition.apiextensions.k8s.io/enterprisesearches.enterprisesearch.k8s.elastic.co created
customresourcedefinition.apiextensions.k8s.io/kibanas.kibana.k8s.elastic.co created
vagrant@k8s-master:~$
vagrant@k8s-master:~$
vagrant@k8s-master:~$ sudo kubectl apply -f https://download.elastic.co/downloads/eck/2.5.0/operator.yaml
namespace/elastic-system created
serviceaccount/elastic-operator created
secret/elastic-webhook-server-cert created
configmap/elastic-operator created
clusterrole.rbac.authorization.k8s.io/elastic-operator created
clusterrole.rbac.authorization.k8s.io/elastic-operator-view created
clusterrole.rbac.authorization.k8s.io/elastic-operator-edit created
clusterrolebinding.rbac.authorization.k8s.io/elastic-operator created
service/elastic-webhook-server created
statefulset.apps/elastic-operator created
validatingwebhookconfiguration.admissionregistration.k8s.io/elastic-webhook.k8s.elastic.co created
```

- All pods running in **kube-system** namespace

```
vagrant@k8s-master:~$ sudo kubectl get po -n kube-system
NAME                                   READY   STATUS    RESTARTS   AGE
coredns-6d4b75cb6d-c578n               1/1     Running   0          33m
coredns-6d4b75cb6d-s7t86               1/1     Running   0          33m
etcd-k8s-master                        1/1     Running   0          33m
kube-apiserver-k8s-master              1/1     Running   0          33m
kube-controller-manager-k8s-master     1/1     Running   0          33m
kube-proxy-j7s6w                       1/1     Running   0          15m
kube-proxy-snjzn                       1/1     Running   0          33m
kube-proxy-vkfg4                       1/1     Running   0          21m
kube-scheduler-k8s-master              1/1     Running   0          33m
vagrant@k8s-master:~$
```

- Deploy Elasticsearch (using Elasticsearch Operator - ECK) which meets the following criteria
  1 master pod
  1 data pod

```
vagrant@k8s-master:~$ sudo kubectl get pods
NAME                          READY   STATUS    RESTARTS   AGE
eck-operator-es-data-0        1/1     Running   0          6m8s
eck-operator-es-master-0      1/1     Running   0          6m9s
```

```
vagrant@k8s-master:~$ sudo kubectl get elasticsearch
NAME           HEALTH   NODES   VERSION   PHASE   AGE
eck-operator   green    2       7.6.2     Ready   6m57s
```

- Each pods has a disk of 10 GB

```
vagrant@k8s-master:~$ sudo kubectl get pv
NAME                          CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS      CLAIM   STORAGECLASS   REASON   AGE
eck-operator-es-data-0        10Gi       RWO            Retain           Available           manual                  3s
eck-operator-es-master-0      10Gi       RWO            Retain           Available           manual                  3s
```

- Data pods are a stateful services and hence need to be configured to share disk across pods

```
vagrant@k8s-master:~$ sudo kubectl describe secret eck-operator-es-elastic-user
Name:         eck-operator-es-elastic-user
Namespace:    default
Labels:       common.k8s.elastic.co/type=elasticsearch
              eck.k8s.elastic.co/credentials=true
              eck.k8s.elastic.co/owner-kind=Elasticsearch
              eck.k8s.elastic.co/owner-name=eck-operator
              eck.k8s.elastic.co/owner-namespace=default
              elasticsearch.k8s.elastic.co/cluster-name=eck-operator
Annotations:  <none>

Type:  Opaque

Data
====
elastic:  24 bytes
vagrant@k8s-master:~$
```

```
vagrant@k8s-master:~$ curl -u elastic:$PASSWORD -k https://localhost:31920
{
  "name" : "eck-operator-es-data-0",
  "cluster_name" : "eck-operator",
  "cluster_uuid" : "ycgoquEqTXGGwp8VRfCDfA",
  "version" : {
    "number" : "7.6.2",
    "build_flavor" : "default",
    "build_type" : "docker",
    "build_hash" : "ef48eb35cf30adf4db14086e8aabd07ef6fb113f",
    "build_date" : "2020-03-26T06:34:37.794943Z",
    "build_snapshot" : false,
    "lucene_version" : "8.4.0",
    "minimum_wire_compatibility_version" : "6.8.0",
    "minimum_index_compatibility_version" : "6.0.0-beta1"
  },
  "tagline" : "You Know, for Search"
}
```

- Kill 1 data pod and ensure that new data pod is launched, and cluster is in green status
- Expose http service using external load balancer